



Directions for Human, Social, Cultural and Behavioral Sciences at the Office of Naval Research

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National Research Council

Committee on Human-Systems Integration



Content

- Why DoD interest in Human Behavior (to include culture)?
 - Easy Answers
 - Missing Pieces
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- ONR Approach
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 - Strategic Guidance
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Why Human Behavior?



“Irregular warfare is about people, not platforms”

IW depends not just on our military prowess, but also our understanding of such social dynamics as tribal politics, social networks, religious influences and cultural mores

People, not platforms and advanced technology, will be the key to IW success

The joint force will need to be patient, persistent, and culturally savvy people to build the local relationships and partnerships essential to executing IW”

Irregular Warfare Joint Operating Concept
11 September 2007

The Easy Answers -- There Are No Easy Answers!

- All Behavior (like Gaul) is divided into three parts
 - Individual
 - Group
 - Societal
- But even if that is true
 - The journey from one level to the next is complex, dependent on many exogenous factors – not the least of which is the nature of the leadership and character of the next higher group
- There are distinct cross-cultural constants
 - Justice and honor? – okay, but how are they manifested?
- We may begin with the same neurophysiological makeup
 - But that becomes modified ethno-linguistically and culturally almost immediately
- The manner in which we study human behavior is segmented by discipline AND culture
 - Most of us are schooled in societies that are Northern European derivatives, but if language forms our thought patterns, the very means we use to study our peoples of other cultures may separate us from the understanding we seek

Missing: *A Common Framework*

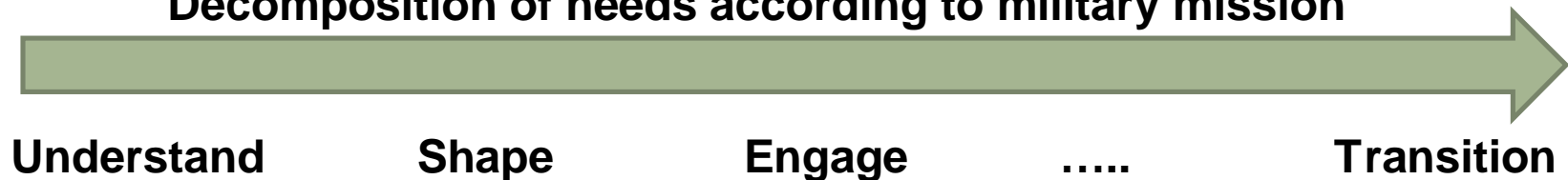
Multi-disciplinary

- Understanding human behavior is complex and approached from the perspectives of multiple disciplines
- Different disciplines have
 - Different vocabularies
 - Various interpretations of events
 - Different understanding of measurement, data, models
 - Timescales varying from nanoseconds in neuroscience to generational scales for social change
- Simply reading each other's findings is NOT good enough
 - Misinterpretations easily result from lack of common vocabularies, frameworks, understanding
- Progress requires a common framework and perspective

Set Focus: *Military Mission*

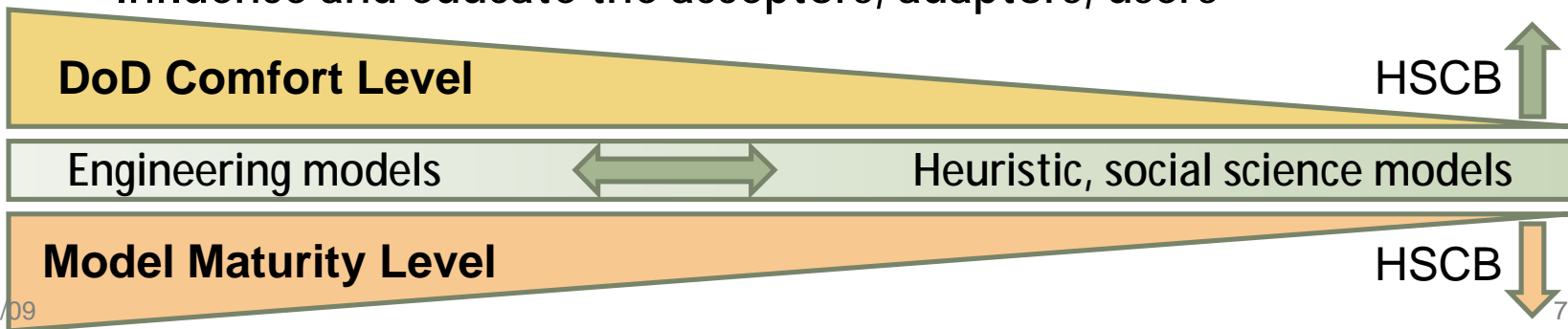
- Understanding the totality of human behavior is beyond the scope of HSCB
- Focus must be on
 - What is critical for military missions
 - Role of military in whole of government actions
 - Understanding needed to specify data and models relevant to the military missions

Decomposition of needs according to military mission



"A" Strategy

- Generate a Rational Collection of Useful Theories
 - Country/region/town
 - Causal variables
 - Computational representations
 - Methods to fit or tune components to problem at hand
- Create ability to acquire data in real environments, particularly non-permissive
 - Contextual data: preconditions, beliefs, etc.
 - Influencers
 - Decision/action space
- Promote acceptance of results
 - Field validation
 - Influence and educate the acceptors, adaptors, users





EVOLVING
ONR APPROACH...



Human, Social, Cultural & Behavioral Modeling

Vision: Mastery of the social, cultural and cognitive factors that optimize the warfighter's ability to influence human behavior in the full range of military operations.

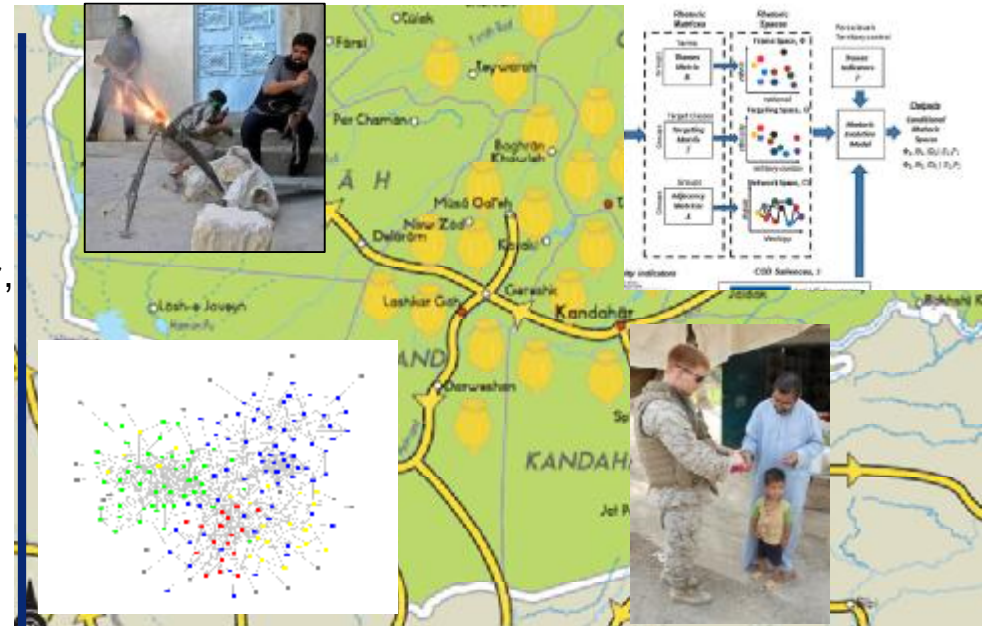
Objectives: Integrated portfolio to study influence of cultural, social and cognitive factors on human behavior, develop data collection methods, build computational models, and validate operationally applicable tools.

Current state of the art:

- Conflicting social science theories across disciplines
- Limited empirical work
- Limited ability to integrate social/cultural understanding into forecasting/exploratory computational models
- No validation, verification or standards for models / datasets

Technical Approach:

- Multidisciplinary teams that include social and computational sciences
- Integrated social science theoretic approaches
- Empirical studies
- Methods to integrate social/cultural influences into computational models



Payoff:

- Improve Training, Operations Planning and Decision Tools for current/future IW environment
- Increase adaptability of force for cross-cultural understanding and interaction critical for training
- Equip US and foreign militaries to undertake counter terrorism and stability operations
- Provide US forces with proactive capabilities for working in the IW environment

Sustained S&T Investment is needed to address these challenges over the 10-15 year horizon.

Strategic Guidance

MC Vision & Strategy 2025

Joint Operational Environments

Irregular Warfare Joint Operational Capability

DoDD 3000.05 Stability, Security, Transformation, Reconstruction

The Long War: Send in the Marines

“Educated and trained to understand and defeat adversaries in complex conflicts. We will go to greater lengths to understand our enemies and the range of cultural, societal and political factors affecting all with whom we interact. . . .”

-Marine Corps Vision & Strategy 2025 pg.6

At its heart war will always involve a battle between two creative human forces. Our enemies are always learning and adapting. They will not approach conflicts with conceptions or understanding similar to ours. And they will surprise us.

Joint Operational Environments, pg 42

Strategic Guidance

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OA

Changing
Security
Environment

AIW FA

EMO/ECO

MCIOC
CONOPS

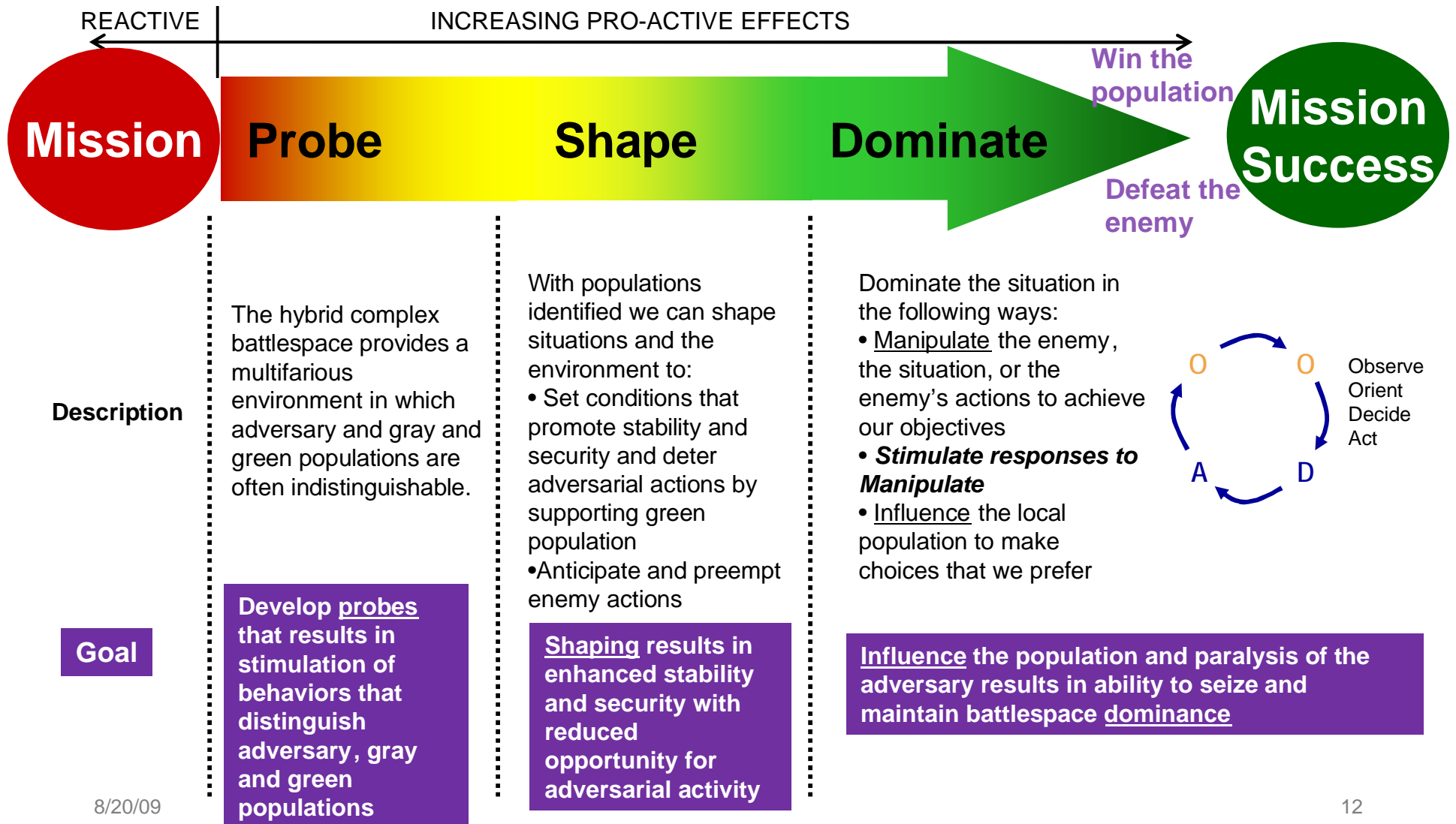
Other...

Concepts

8/20/09

Acronyms	
OA	Operational Adaptation
AIW FA	AIW Focus Area
EMO	Enhanced MAGTF Operations
ECO	Enhanced Company Operations
MCIOC	Marine Corps Information Operations Center
CONOPS	Concept of Operations

OA CONCEPT for HSCB





Changing Security Environment

“It will be dominated by wars fought among the people, where the objective is not to crush an opponent’s war making ability but to influence a population’s ideas and collective will.” **Marine Corps Operating Concepts for a Changing Security Environment** pg 54

*From the MC Warfighting Concepts and Capabilities, 2007

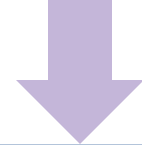


AIW Focus Area: Socio-Cultural Domain Analysis

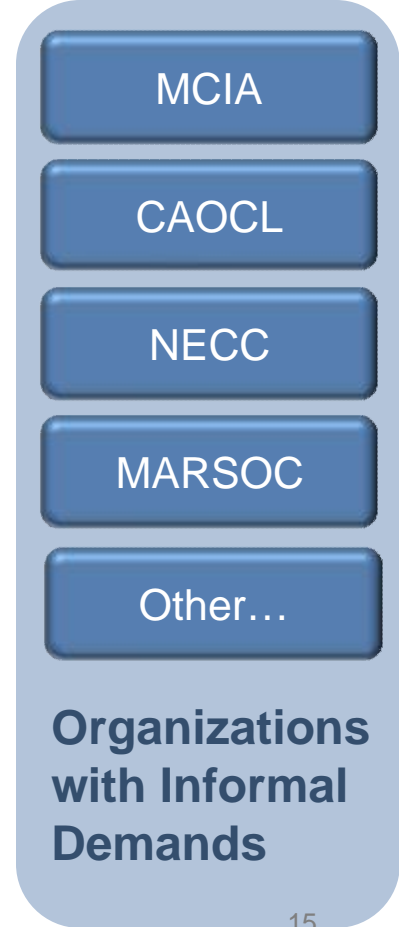
AIW Focus Area-SCDA	Capability Gaps	TIA's
Social, cultural, behavioral data understanding and collection	<ul style="list-style-type: none"> •Understanding Population •Understanding the Adversary •Baseline behavior 	<ul style="list-style-type: none"> •Theory, Understanding and Data generation
Persona identification, understanding and modeling	<ul style="list-style-type: none"> •Understanding population, adversary 	<ul style="list-style-type: none"> •Theory, Understanding and Data generation •Analytics and Modeling
Human/social network identification, understanding, and modeling	<ul style="list-style-type: none"> •Understanding Population •Understanding the Adversary •Forecast events and effects 	<ul style="list-style-type: none"> •Theory, Understanding and Data generation •Analytics and Modeling
Threat behavior detection, understanding, and modeling	<ul style="list-style-type: none"> •Understanding Adversary behavior •Baseline behavior 	<ul style="list-style-type: none"> •Theory, Understanding and Data generation

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Acronyms	
NECC	Naval Expeditionary Combat Command
MCIA	Marine Corps Intelligence Agency
CAOCL	Center for Advanced Operational Culture Learning
MARSOC	Marine Special Operations Command



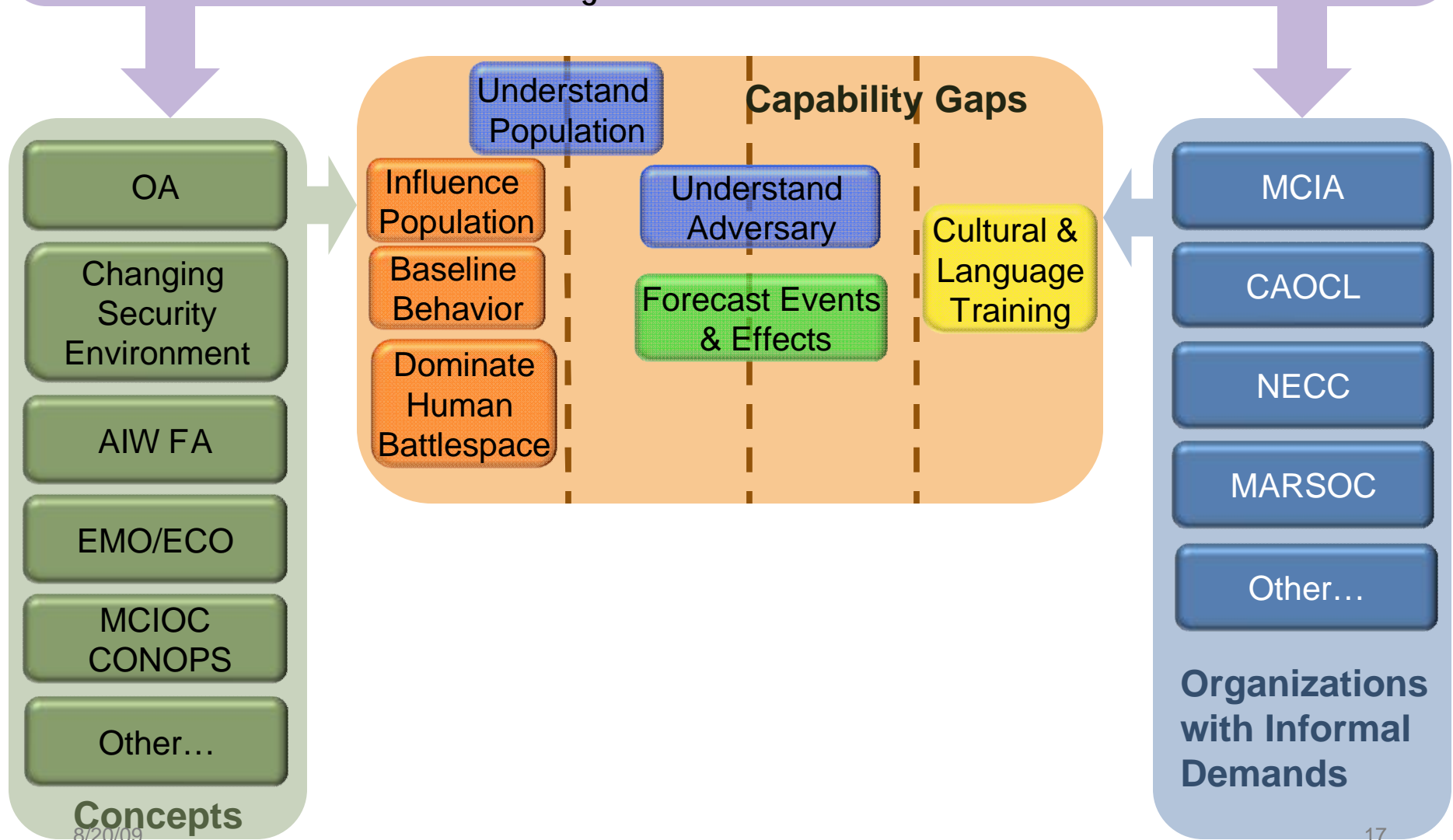


Informal Demand Signals

- NECC: Priority S&T areas: Enhanced Cultural Awareness for Expeditionary Sailors
- MCIA: Identified R&D and Knowledge Product needs
 - Culture specific information for operationally relevant cultures
 - Training methods and information for incorporation of cultural socio-cultural context into intel analysis
- CAOCL: Training
 - Curriculum for regional specialists within MC
 - Pre-deployment and deployable culture and language training
- MARSOC: Socio-Cultural Training

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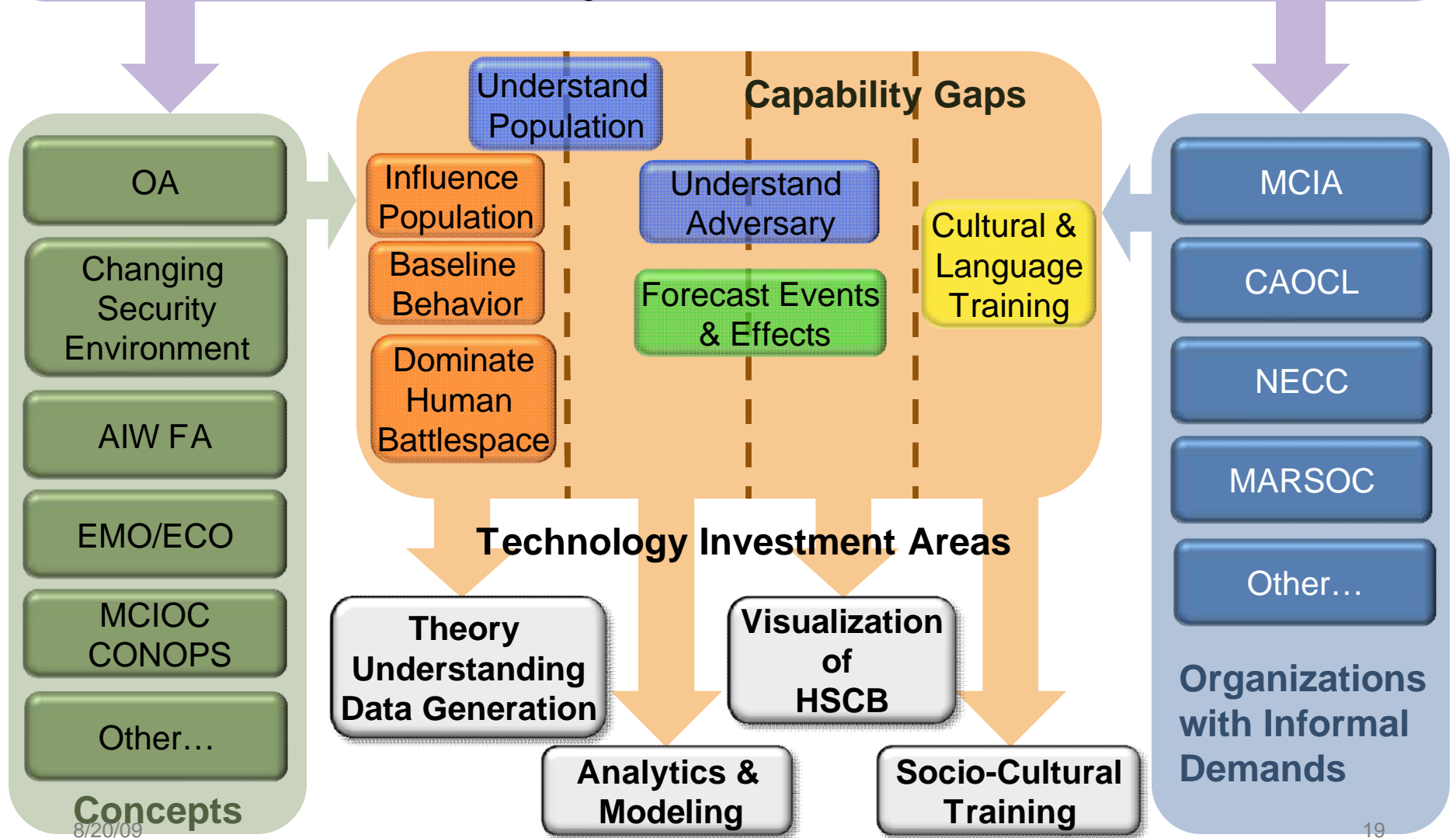


Capability Gaps

- **Baseline Behavior-** Knowledge and methods for assessing and understanding typical behavior profile at the individual, group and society level
- **Dominate Human Battlespace** – Enable the OA concept of proactive domination of the human element of the battlespace
- **Influence Human Behavior** – Capability and tools to influence human behavior through non-kinetic means
- **Understand Population** – Understand the influences and behaviors of the population
- **Understand Adversary** – Understand influences and behaviors on/of the adversarial population
- **Forecast (explore) Events/Effects** – Models that allow for the exploration of possible outcomes/effects based on specific actions or events. Long term goal is forecast ability.
- **Culture and Language Training** – Provide culture general and culture specific training to enable Marines to interact with foreign populace and militaries effectively.

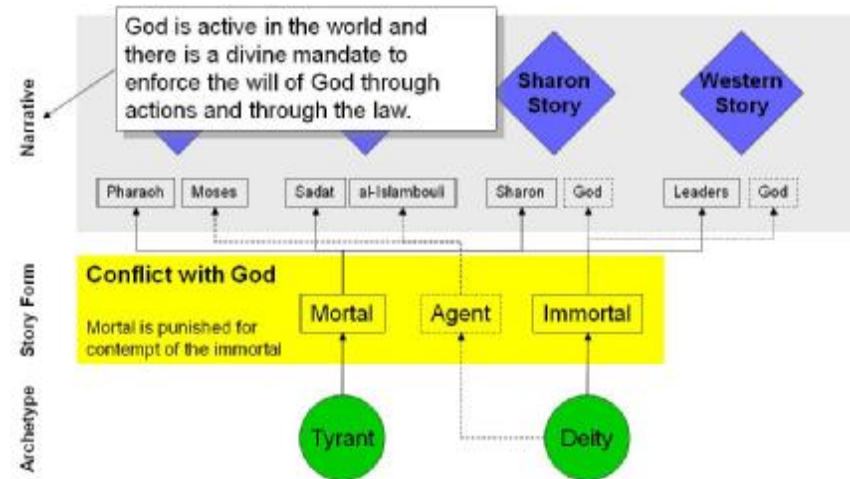
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Example: Theory, Understanding & Data Generation

- Objective: Develop a strategic communication approach for understanding how extremist narratives function
- Task 1: Develop Narrative Database
- Task 2: Develop Traction Model and Measure
- Use extant theories of message contagion to generate new message traction model
 - Diffusion of innovation, Ideodynamics, Memetics, Stickyness
- Develop a computational, agent-based model to test these competing factors



Nominal Narrative Database



Arizona State University

Example: Analytics and Modeling

- **OBJECTIVE:** Provide analysts & HSBC modeling experts with a single tool to define policies that manage inconsistency and incompleteness in their HSBC information management needs
- Develop inconsistency management policies (IMPs) and partial information policies (PIPs)
- Develop policy (IMP/PIP) sensitive algorithms that allow warfighters to gain knowledge from incomplete/inconsistent data.

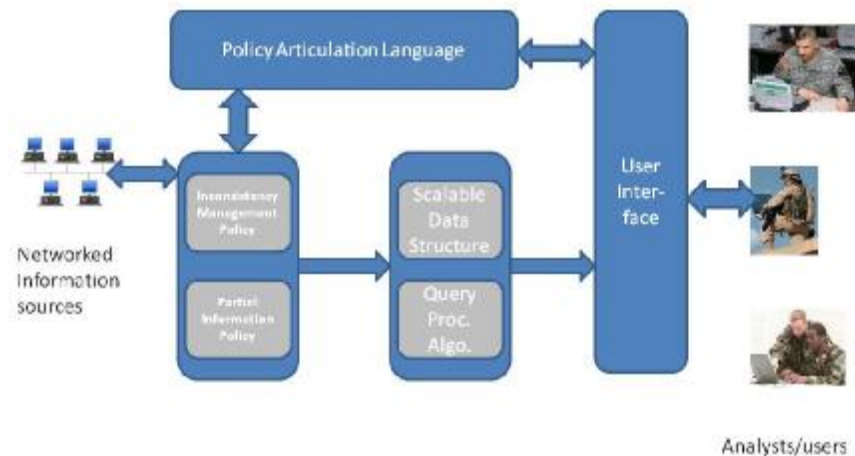
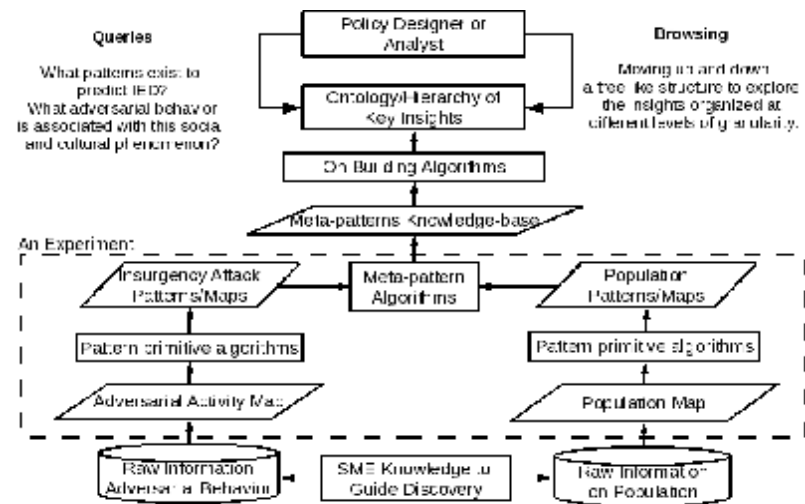
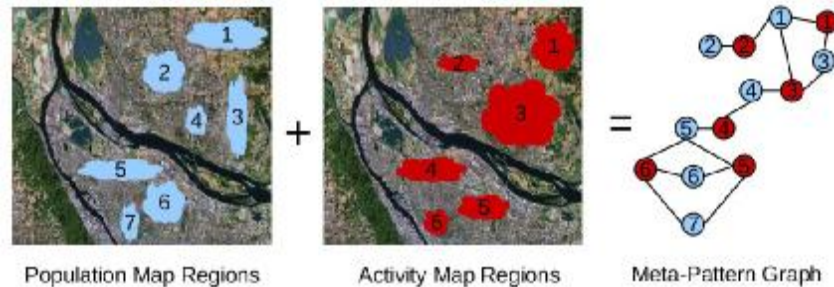


Figure 1. Architecture of the SIMS system

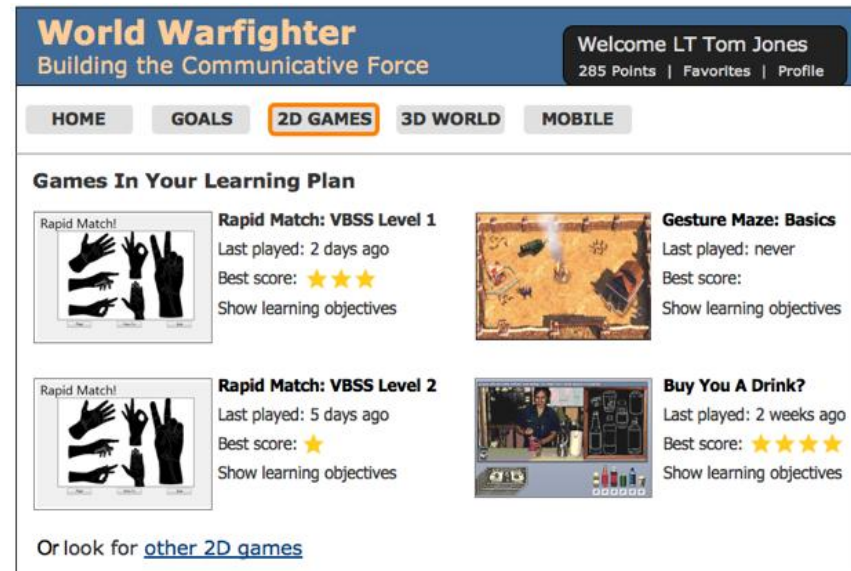
Example: Visualization

- Objective: Data-mining of adversarial event data to find spatio-temporal heat maps
- Hypothesis: Can HSCB information be used to differentiate the “grey” from the “green” population
- What's new about the approach:
 - Automatically populate and organize knowledge into an ontology
 - Bottom-up/theoretic/data-driven approach that could prove/disprove/complement existing theories.



Example: Socio-Cultural Training

- **OBJECTIVES:** Equip warfighters with a basic level of verbal and nonverbal skills and fulfill the promise of a “communicative force”
- **Approach:** Define specific communication tasks indexed to a range of warfighter missions, roles, and tasks
- **Products:**
 - A individually customized, web based Learning Platform
 - 2D, 3D, and Mobile Activities for SME selected verbal, nonverbal gestures, and behaviors







World Warfighter
Building the Communicative Force

Welcome LT Tom Jones
285 Points | Favorites | Profile

HOME GOALS **2D GAMES** 3D WORLD MOBILE

Games In Your Learning Plan

 <p>Rapid Match: VBSS Level 1 Last played: 2 days ago Best score: ★★ Show learning objectives</p>	 <p>Gesture Maze: Basics Last played: never Best score: Show learning objectives</p>
 <p>Rapid Match: VBSS Level 2 Last played: 5 days ago Best score: ★ Show learning objectives</p>	 <p>Buy You A Drink? Last played: 2 weeks ago Best score: ★★★★★ Show learning objectives</p>

Or look for [other 2D games](#)

Kinection



Focus 2010 - Goal

- Showcase DoD-wide work in the general HSCB modeling area
- Engage OSD HSCB modeling researchers and leading scientific and technical experts working in HSCB related fields
- Showcase programs from DoD and other Government agencies
- Help shape the future of the OSD HSCB Modeling Program

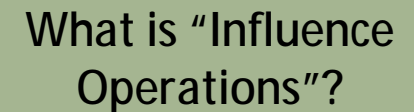


Meeting Specifics

- Held 5 to 7 August 2009– Chantilly, VA
- 629 Attendees (originally anticipated ~250)
- Government, Industry, Academia
 - $\frac{1}{5}$ Military, $\frac{1}{5}$ other government organizations, $\frac{2}{5}$ Industry, $\frac{1}{5}$ Academia
 - US government organizations– DHS, DOD, NASA, DARPA, NSF, FBI, DOE
 - Combatant commands – SOCOM, EUCOM, PACOM, JFCOM
- Multidisciplinary
 - Sociologists, Anthropologists, Psychologists, Engineers, Computer Scientists, Warfighters, Analysts

Results

- Multi-discipline (Inter-discipline) challenges
 - Different vocabularies, understanding of measurement, data, models, time lines (nanoseconds to eons)
 - Build Inter-Disciplinary teams
 - Missing military context/definitions
- Data challenges
 - Ontology/Taxonomy/Data Model, Dictionary
 - Develop a way to tag (and maybe even fill-in) missing data



What is "Influence Operations"?

Results

- Scenario challenges
 - Diverse sets of missions and situations with uncertainty
- Knowledge challenges
 - Need Social Science competency and fundamental foundations to lead to robust & resilient models
 - Modeling uncertainty and multiple resolutions/aggregation
 - Question Western “social science” assumptions
- Modeling & Analysis challenges.
 - Selecting the appropriate model(s), understanding computational limitations, and getting timely analysis results
 - Specific vs. Generic models – can HSCB models be “generalized”?

Questions?



“But no one should ever neglect the psychological, cultural, political, and human dimensions of warfare. War is inevitably tragic, inefficient, and uncertain, and it is important to be skeptical of systems analyses, computer models, game theories, or doctrines that suggest otherwise.”

–Secretary Gates, *Foreign Affairs*, Jan/Feb 2009



BACKUPS



TIAR Theory, Understanding & Data Generation

Sub-TIAs

SC Influences

- Mapping the Trajectories of Military Intervention
- Bomb to Bombmaker
- Cultural Influences on Intertemporal Reasoning
- Know Thyself: Analysis of BLUFOR Learning in COIN
- Identifying and Countering Terrorist Narratives
- Anticipating Adversaries Actions
- Extremist Ideological Influences on Terrorist Decision Frameworks
- Belief Formation in Radicalization
- Modeling Outcomes of Coordinated USG and NGO Efforts

Enablers

- Data Frameworks and Taxonomies Workshop
- S&T Roadmap for Human Social Cultural and Behavioral Modeling

Methods for Data Collection and Analysis

- Recognizing Patterns of Anomie that Lead Insurgency
- Online Social Behaviors and Prediction of their Implications for the Physical World
- Multimethods Approach Study of the Islamic Diaspora
- Cross National Analysis of Islamic Fundamentalism
- Competitive Adaptation in Terrorist Networks

HSCB Physiological and Psychological Variants

- Novel Methods for Detecting Deception
- Neural Measures of Intergroup Conflict
- Moral Outrage and the Neurobiological Antecedents to Political Conflict

TIA: Analytics and Modeling

Sub-TIAs

Methods & Infrastructure to Support Modeling

- Cultural Behavioral Model Docking Method Development
- Hybrid Adversarial Prediction System
- Breadth-Depth Triangulation for Validation and Verification
- Methods and Algorithms for Gleaning Meaning from Real World
- SIMS Scalable Incompleteness and Inconsistency Management Strategies
- Architecture to Support Socio-Cultural Modeling
- Social and Cultural Model Embedding Technologies

Model Construction for Specific Applications

- Understanding RSM
- Tempus Tec
- Hybrid Knowledge Frameworks for Complex Operations
- An Agent Based Modeling Framework for SSTR Mission Planning and Assessment
- SCAPT: Strategic COmmunicaitons Analysis and Planning Tool
- Modeling Insurgent Rhetorical Dynamics
- Interpreting and Responding to Events in Arab Cultures
- Modeling Strategic Contexts
- Computational Social Science Simulation of the Afghanistan-Pakistan Opium Supply Chain



Visualization Support for HSCB

Sub-TIAs

Methods for Operationalizing
Data Visualization

- Automated Discovery and Predication of Insurgent Behavior

Tools to Support Exploration of
Model Outputs



TIA: Socio-Cultural Training

Sub-TIAs

Cross-cultural Skill Training

- Enhancing Warfighter Cross-Cultural Awareness and Rapid Perspective Taking Skills
- Commonsense socio-cultural models for culture training in serious games
- Task based communications training system
- Applying virtual simulation for training cultural gestures

Culture Specific Training Skills

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